

TAXONOMIC NOTES ON THE ORDER EMBIOPTERA. XVI-XVII.

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(One hundred and eighteen Text-figures.)

[Read 31st July, 1940.]

XVI. THE GENUS *EMBIA* LATREILLE.

(Seventy-seven Text-figures.)

Genus *EMBIA* Latreille 1829.

Le Règne animal distribué d'après son organisation, par M. le Baron Cuvier, Nouvelle Édition, revue et augmentée; p. 257 (foot-note). No specific name given. Genotype, *Embia savignyi* Westwood, 1837, *Trans. Linn. Soc. London*, 17, p. 372.

Savigny (1809-1813) figured (Pl. ii, figs. 9-10) a species of the Order from Egypt, but no name was applied. Latreille (1825, p. 437) used the name *Embie*, as vernacular, and without description or reference to a previous description or figure; this use has therefore no taxonomic standing. Audouin (1827) used *Embie* with reference to Savigny's figure, but the name is still vernacular, and no standing can be attributed. In the same year Berthold made use of the form *Embium*, the first Latinized form; this, however, receives no consideration, being a *nomen nudum*.

Latreille (1829, p. 257), under the name *Embia*, gives a short description, together with a note that the insect to which he refers was figured by Savigny. Although *Embia* is here used alone, that is, as a uninomial, the genus dates from this record (cf. Opinions rendered by the International Commission on Zoological Nomenclature, Opinion 54, wherein certain genera of Rafinesque 1820, an author who was accustomed to use binary nomenclature, are confirmed as dating from 1820, though used by Rafinesque uninomially, without designation of species).

In 1832, Griffith and Pidgeon (ex Gray manuscript) described a Neotropical Embiopteran, *Olyntha brasiliensis*, *Olyntha* being designated a subgenus of *Embia* Latr. The plate illustrating this species, drawn by Westwood, was issued as by Griffith and Pidgeon in 1831, with the title 'Embius? Brasiliensis G. R. Gray'; the query applying, not to the identity of the species (as only one specimen was then known; see Westwood, 1837, p. 369), but apparently to doubt, at the time the plate was prepared, of the Latin ending to apply to the vernacular 'Embie' of Latreille (1825) and Audouin (1827). The generic name *Embius*, dating from 1831 (but corrected by its authors to *Embia* in 1832), is a homonym of *Embia* Latreille 1829, by application of Opinion 115 of the International Commission. The name *Olyntha* is also invalidated by *Olynthus* Hübner 1818 (Coleoptera), a member of the same Class. The Neotropical series is not congeneric with the North African series (*Embia* Latreille), and a new name is required to replace the invalidated *Olyntha*.

In 1837 Westwood described *Embia savignyi*, his description being based, not on any actual specimen, but on Savigny's figure, the original of which is the type of the species. As Savigny's figure lacks certain essential details (e.g. of the

terminalia), and as there has been some lack of agreement on the limits of the species, a neotype from the Egyptian region is described below in order to fix the species permanently.

It would be misleading to accept *brasiliensis* Griffith and Pidgeon 1831 as the genotype (by monotypy) of *Embius* (*Embia* homonym), and this course is rendered unnecessary by the query on the plate (1831) of these authors. *Embia savignyi* Westwood 1837 may be accepted as genotype of *Embia* Latreille 1829; this is indeed the current procedure (cf. Krauss, 1911; Enderlein, 1912). The Neotropical series, of which *Olyntha brasiliensis* is a typical example, will receive a name to replace the invalidated *Olyntha*, and an adequate generic description, in the subsequent part of this series; Griffith and Pidgeon's criteria for its separation (subgenerically) from *Embia* are less important than other criteria which might have been chosen from the specimen named by these authors. This series is confined to the New World, just as *Embia* Latreille is confined to the Old World (Mediterranean Region south to South Africa).

The genus *Embia* may be defined as follows, the concept being formed on agreement with the genotype in characters considered sufficient for generic differentiation, but not so embracing as those used previously (e.g. Enderlein 1912), which give too wide limits to the genus, and assemble in it unrelated forms:

Old-World Embioptera, the males with the following characters: Winged or wingless; if winged, veins well developed, R_1 usually confluent subterminally with R_{2+3} , R_{4+5} forked, M simple except for individual anomalies; anterior branch of cubitus simple, occasionally with additional pigment-bands between it and the cubital stem, but these are not usually accompanied by veins. Hind tarsi with one terminal bladder on the ventral side of the first segment, the rest of the plantar surface of the metatarsus carrying strong setae. Terminalia with tenth abdominal tergite completely cleft longitudinally; right hemitergite massive, with a posteroventral process, usually acute, and an inner sublittoral flap of chitin connected posteriorly, anteriorly separated by membrane. Process of left hemitergite simple, tapered. First segment of left cercus clavate (usually not excessively so), echinulate internally. Other segments of cerci subcylindrical. Right cercus-basipodite small, subannular; left cercus-basipodite with a process. Hypandrium produced backward to an obtuse process to the right of the mid-line.

The characters differentiating each related genus, dealt with previously in this series, from *Embia* in the present sense, have been included under those genera; the differentiation of the Neotropical series usually referred to *Embia* will be shown in the subsequent part of this series.

The genus *Euembia* Verhoeff (1904) is an absolute synonym of *Embia*. The genus *Monotyloia* Enderlein 1909 (*Zool. Anz.*, 35, p. 188; genotype *Embia ramburi* Rimsky-Korsakov 1905, *ibid.*, 29, p. 434) must also be rejected as a synonym. As will be seen from the re-description of *E. ramburi* (infra), its terminalia agree in every respect with the generic description, as do its tarsi; it could not be separated generically on any character but the absence of wings in the male (present in *E. savignyi*; absent in *E. ramburi*). It is known that the absence of wings is a highly convergent character in the Embioptera, and it is in fact a character of very little taxonomic value; winged and wingless forms of a single species of some genera may occur in the same colony (cf. Davis, 1938, p. 254, and papers there cited). Winglessness, unsupported by any other character, cannot be regarded as a generic criterion in this Order. Species with winged males also hybridize with species with wingless males, according to Friederichs (1934).

EMBLIA SAVIGNYI Westwood 1837. Figs. 1-16.

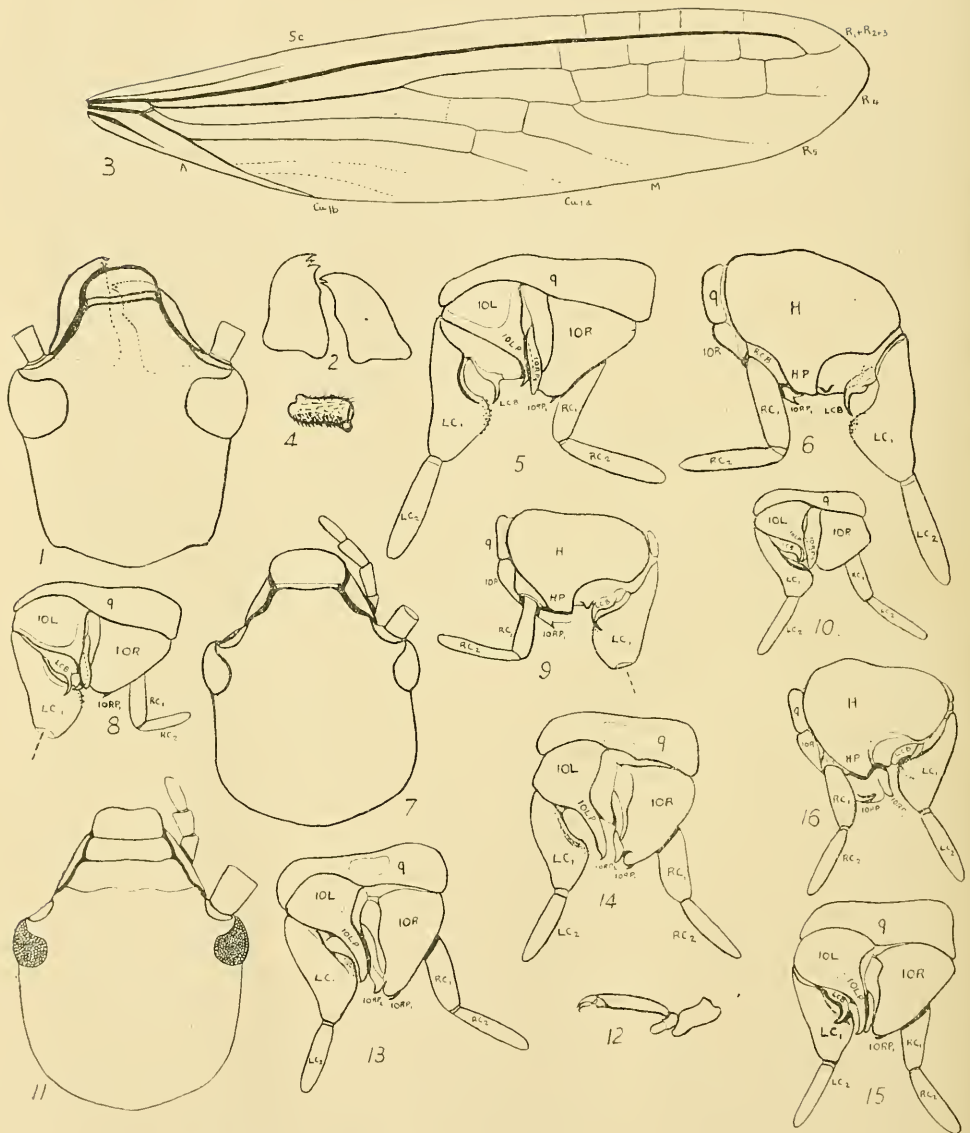
Trans. Linn. Soc. London, xvii, p. 372.

The lack of any specimen serving as a type, as noted above, has led to some variation in different authors' concepts of the species. To obviate this, a male has been selected, labelled as neotype, and deposited in the British Museum of Natural History. It agrees with the specific concept of Krauss (1911) and Werner (1912), but differs in some respects from the specimen figured under this name by Enderlein (1912, fig. 12). This specimen (Berlin Museum) has the left cercus-basipodite (ast₉ of Enderlein's figure) different from the neotype here named. Enderlein did not name his specimen neotype, nor did he in any way indicate that it was in future to represent the species; it would be unwise to select it as neotype at the present juncture, as, to judge from Enderlein's figure, some structures (particularly the left cercus) have been distorted, apparently by over-maceration and too liberal application of pressure to the cover-slip. It appears to be specifically distinct from the neotype, but in view of its distortion, and the lack of detailed locality, it cannot be named.

♂ (neotype). Length 13 mm.; head 2.0 mm. × 1.6 mm.; forewing 10.8 mm. × 2.4 mm.; hindwing 10 mm. × 2.4 mm. General colour (dry) pale ferruginous brown, terminalia darker brown, eyes black; wing-veins dark brown, bordered by bands of pale ferruginous brown. Head (Fig. 1) with eyes large, rather prominent, sides behind eyes converging slightly; posterior margin with a slight concavity on each side, just within the angle with the lateral margin. Antennae incomplete (according to Krauss, l.c., 19-segmented). Mandibles (Fig. 2) with incurved acute teeth terminally and subterminally, the left with three, the right with two. Wings (Fig. 3) with R₁ confluent subterminally with R₂₊₃; R₄₊₅ forked, fork subequal to stem in length; media simple in all wings, distinct except at distal extremity; main stem of cubitus (Cu_{1b}) with a long, well-developed anterior branch (Cu_{1a}); between this and the stem there is an additional pigment-band (two in the right forewing; represented by dotted lines in Fig. 3), not supported by any indication of a vein. Anal distinct, rather long. Cross-veins moderately frequent.

First tarsal segment of hind legs (Fig. 4) with only the terminal ventral bladder present; remainder of ventral surface clothed evenly with strong setae. Terminalia (Figs. 5-6) with tenth abdominal tergite completely divided longitudinally; right hemitergite (10R) massive, subtriangular, with a postero-ventral process (10RP₁), short and acute, directed slightly to the left. Inner margin of 10R carrying a flat subelliptical chitinous flap (10RP₂), separated from 10R by membrane except at its posterior limit. Left hemitergite (10L) smaller than 10R, subtriangular, inner margin produced backward to a thin process (10LP), curved to the left, acute. Right cercus with two subcylindrical segments (RC₁, RC₂), arising from a small subannular cercus-basipodite (RCB). First segment of left cercus (LC₁) with inner margin smoothly dilated in an echinulate lobe in the distal third; concavity of inner margin basal to lobe weakly channelled by a shallow longitudinal furrow. Second segment (LC₂) subcylindrical. Hypandrium (H) produced back to an obtuse process (HP) somewhat to the right of the midline. Left cercus-basipodite (LCB), placed between HP and base of LC₁, produced backward to a rather slender, acute process, curving outward.

Locality.—The labels on the neotype (British Museum) are: 'G. R. F. Medani, H. W. Bedford, 22.12.22. Sudan Govt.'; 'Blue Nile. A125'; 'Embla savignyi, det. Friederichs 1936'.



*Figs. 1-6.—*Embia savignyi* Westw., neotype ♂. 1. Head from above, × 20. 2. Mandibles from above, × 20. 3. Right forewing, × 10. 4. First segment of hind tarsus viewed laterally, × 20. 5. Terminalia from above, × 20. 6. Terminalia from below, × 20.

Figs. 7-9.—*Embia savignyi* Westw., variant ♂ from Blue Nile region. 7. Head from above, × 20. 8. Terminalia from above, × 20. 9. Terminalia from below, × 20.

Fig. 10.—*Embia savignyi* Westw., ♂ (type of *E. enderleini* Esb.-Petersen). Terminalia from above (magnification not stated. After Esben-Petersen, 1915, fig. 11).

Figs. 11-16.—*Embia savignyi* Westw., ♂ (type of *Embia socia* Navás). 11. Head from above, × 20. 12. Hind tarsus viewed laterally, × 20. 13-15. Terminalia from above, varying aspects, × 20. 16. Terminalia from below, × 20.

Note.—The neotype agrees with Savigny's figure, as far as it goes, although Savigny's specimen had a venational anomaly in the right forewing (R_4 forked). It shows the anterior branch of the cubitus (Cu_{1a}) very long, as in the neotype, but the accessory pigment-bands of the neotype are not indicated in Savigny's figure; their presence is, at all events, an individual character (cf. also Enderlein, 1912, fig. 13, forewing), and they are absent in many specimens from the Egyptian region correctly referable to *E. savignyi*.

The exact structure of the specimen studied by Savigny can never be determined, and the neotype, selected arbitrarily, must stand for the species in future.

Variation and synonymy.—A second specimen from the Blue Nile region (coll. E. S. Cressin; British Museum) must be considered conspecific with the neotype, but shows some interesting variations. The head (Fig. 7) has smaller eyes, and the sides behind the eyes diverge slightly at first; the posterior margin is more smoothly rounded (in the characters of the head, this specimen agrees with *E. mauritanica* Lucas, q.v.). The general colour is a little darker than in the neotype, and the dimensions less (length 9 mm.; head 1.8 mm. \times 1.4 mm.; forewing 7 mm. \times 1.7 mm.; hindwing 6 mm. \times 1.7 mm.). The cubitus has an additional pigment-band (between Cu_{1a} and the stem) only in the left forewing. The terminalia (Figs. 8–9) are scarcely distinguishable from the neotype.

For further references to the variability in colour and size, and to the distribution, the works of Krauss (1911), Werner (1912) and Karny (1923) should be consulted; all, however, may have a somewhat wider concept of the species than the present.

The following species seem to be synonyms with *E. savignyi*:

Embia aegyptiaca Blanchard, 1845, *Hist. nat. des Insectes*, 3, p. 47 (Paris).

Embia enderleini Esben-Petersen, 1915, *Ent. Mitt.*, iv, nos. 1–3, p. 86, figs. 10–11.—As Karny (1923) has already noted, there seems little reason for the separation of this species. It is therefore provisionally rejected as synonymous. The location of the type is not stated. Esben-Petersen's description may be summarized as follows: ♂. Colour as in the neotype of *E. savignyi*; antennae with 24 segments; wings as in the neotype, but without additional pigment-bands in the cubital system; terminalia (Fig. 10, after Esben-Petersen) indistinguishable from the neotype, except that the inner face of the first segment of the left cercus has a more marked longitudinal concavity basad to the echinulate lobe. Length 10.5 mm., of forewing 7.5 mm., of hindwing 6.5 mm.

Locality.—Dabba el Gardega, White Nile, 7/3/13.

Embia socia Navás, 1929, *Rev. Zool. Bot. africanes*, 18, fasc. 1, p. 108, fig. 19.—The following re-description of the unique type ♂ (Mus. Congo, Tervueren) should suffice to prove the synonymy with *E. savignyi*: Length 9.5 mm., of forewing 6 mm.; head (Fig. 11) 2.0 mm. \times 1.6 mm., form more as in figure 7 than in neotype; antennae 3.2 mm., with 22 segments. Wings as in the type of *E. enderleini*; hind tarsi (Fig. 12) as in the neotype. Terminalia (Figs. 13–16) as in the neotype. *Locality*: Radjaf, Soudan, 30.v.1927, L. Burgeon. The colour (rather dark brown)

* All setae omitted except in Figs. 4, 25, 50 and 72. Original figures all based on camera lucida outlines except Figs. 17–23, 29–31, 35–38, 45–52, and 70–74, which were prepared with the constant use of an ocular micrometer. Conventional lettering for venation.

9, ninth abdominal tergite; 10L, 10R, left and right hemitergites of tenth abdominal segment; 10LP, process of 10L; 10RP₁, 10RP₂, posterior and inner processes of 10R; LC₁, LC₂, RC₁, RC₂, first and second segments of left and right cerci; LCB, RCB, left and right cercus-basipodites; H, hypandrium; HP, process of H.

and head structure agree with the second specimen discussed above, but this cannot be allowed as distinct from *E. savignyi*.

Donaconethis ehrenbergi Enderlein, 1909, *Zool. Anz.*, 35, p. 178.—The occasional forking of the media in one or more wings has been noted for *E. savignyi* by Krauss (1911, p. 64, and Pl. v, fig. 21D). This probably explains the identity of *Donaconethis ehrenbergi* End.; if Enderlein's figure of the terminalia (1912, fig. 70) actually refers to his type (as he suggests), then there can be no doubt as to the synonymy. The terminalia, according to this figure, have no resemblance to the genus *Donaconethis*, but agree exactly (allowing for distortion) with the neotype of *E. savignyi* Westw.

EMBIA MAURITANICA Lucas, 1849. Figs. 17-23.

Exploration scientifique d'Algérie, Zoologie, 3, p. 111, Pl. 3, figs. 2a-n.

Lucas's types (Mus. Paris) are in an excellent state of preservation (in alcohol), and include five males. The locality is given merely as 'Algérie'; the detailed locality of the type series is unknown, but probably is Central or Eastern Algeria. The re-descriptions of the species by Krauss (1911) and Enderlein (1912) were not based on type material. The following details refer to the type series:

♂. Length 8.5-15 mm. (8.5, 10, 10.5, 13, and 15 mm. for members of the type series). Length of forewing 6-10 mm.; head 2.0-2.3 mm. × 1.5-1.8 mm. General colour (in alcohol) golden-brown, head darker, eyes black; anterior abdominal sclerites paler brown; wing-veins dark brown, bordered by smoky-brown bands, inter-venal lines hyaline. Head (Fig. 17) with eyes small, sides behind eyes diverging at first, rounded behind. Mandibles (Fig. 18) as in *E. savignyi*; wings as in *E. savignyi*, the cubitus two-branched, without additional pigment-bands. Hind tarsi as in *E. savignyi*. Terminalia (Figs. 19-23) very similar to *E. savignyi*, the left hemitergite (10L) with its outer margin slightly elbowed at the origin of the process (10LP), the first segment of the left cercus (LC₁) a little thicker, the internal swelling more distal in position, and the process of the left cercus-basipodite (LCB) shorter, and arising from nearer to the hypandrium (H).

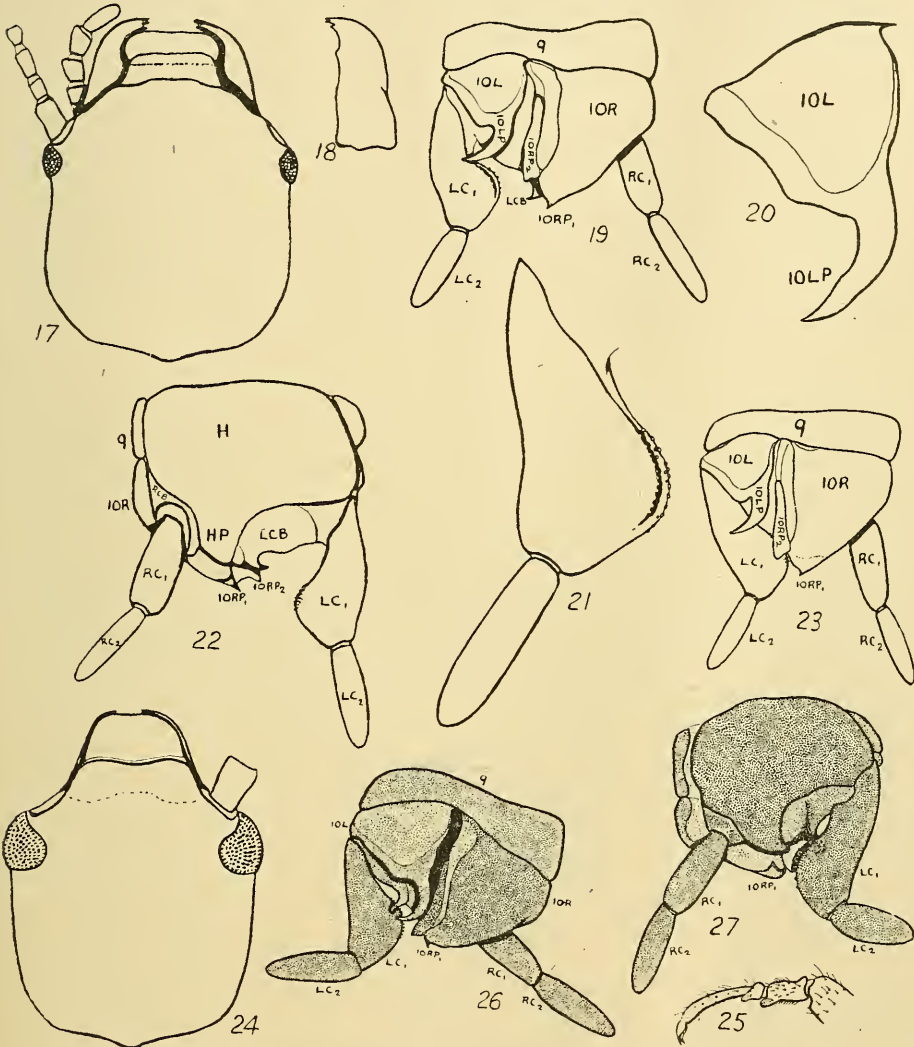
♀. Length 11-12 mm.; general colour mid-brown to rather dark brown; tarsi as in the male. As is usual in this Order, there is little to distinguish the female from other species of the genus, or even of some unrelated genera.

Note.—The localities cited by Krauss (1911) (Spain, West and South Algeria, Canary Islands, Syria, and British East Africa) should be viewed with distrust; many of the records are based on larvae, and even where males were seen by Krauss (Cartagena, Spain; Ain Sefra, Western Algeria; Biskra and Ghardeja, Southern Algeria; Teng-Tina, Syria; and British East Africa), the identification was probably based on dried, unprepared material, and the specific limits may be assumed to have been broader than the present concept, based on the type series. The record for British East Africa represents the type of *E. verhoeffi* Fried. (q.v.), an entirely different species. The locality is actually Portuguese East Africa (fide Enderlein, 1912, p. 44).

The only specimen, other than the type series, seen by me, that I would unhesitatingly refer to *E. mauritanica*, is from Biskra, Algeria (♂: British Museum; coll. G. C. Champion); several other series are discussed below, in each case being somewhat atypical.

Variation.—A male from Kébili, Tunisia (Mus. Comparative Zoology, Harvard University) may be referred to *E. mauritanica*, though it shows some affinities with other species. The dimensions are: Length 11 mm.; head 2.2 mm. × 1.7 mm.; forewing 8 mm. × 2 mm. General colour (dry) dark brown. Head (Fig. 24) with

eyes larger, and sides more convergent, than in the types, in this respect varying towards the neotype of *E. savignyi*. Tarsi (Fig. 25) as in the types, and throughout the genus. Terminalia (Figs. 26-27) as in *E. mauritanica*, types, but with the first segment of the left cercus and the left cercus-basipodite tending towards



Figs. 17-23.—*Embia mauritanica* Lucas, ♂ (type series). 17. Head from above, × 19. 18. Left mandible from below, × 19. 19. Terminalia from above, × 19. 20. Left hemitergite of tenth abdominal segment, from above, × 25. 21. Left cercus, different aspect from fig. 19, × 35. 22. Terminalia from below, × 19. 23. Another specimen from the type series: terminalia from above, × 19.

Figs. 24-27.—*Embia mauritanica* Lucas, var., ♂ from Kébili, Tunisia. 24. Head from above, × 20. 25. Hind tarsus viewed laterally, × 20. 26. Terminalia from above, × 20. 27. Terminalia from below, × 20. (Stippling on figs. 26-27 to indicate degree of pigmentation and sclerotization.)

E. savignyi Westw. (supra) and *E. tuncetana* Nav. (infra). The terminalia seem to agree with Enderlein's figure of *E. savignyi* (1912, fig. 12), which is not typical of that species in the present sense.

A male in the British Museum (Azazga, Kabylie, Algeria, G. C. Champion) varies less from the type series of *E. mauritanica* than does the above.

Other series are considered under *E. tuncetana* Nav.

EMBLIA FIBULATORIA Enderlein 1912. Fig. 28.

Coll. zool. de Selys-Longchamps, fasc. 3, p. 111, fig. 73.

♂ (after Enderlein, l.c.). Length 8.5–10 mm.; head 1.7–2.0 mm. × 1.2–1.4 mm.; forewing 7.5–8.5 mm. × 1.7–2.1 mm.; hindwing 6.8–7.8 mm. × 1.7–2.1 mm. General colour pale yellowish-brown, eyes and antennae darker, wings with dark-brown veins bordered by pale-brown bands. Description of head outline agrees with that of *E. savignyi*. Terminalia (Fig. 28, after Enderlein) as in *E. savignyi*, but both the process of the left hemitergite (10LP) and the left cercus-basipodite (LCB) longer and thinner. Enderlein's figure omits the structures appended to the right hemitergite, which may be assumed to agree with *E. savignyi*.

♀ unknown.

Locality.—Inner Cameroons (Rei Buba, Djurum, Garena, Ubao, and Tschad-See (Lake Chad)); types in Berlin and Stettin Museums.

This species is clearly differentiated from the typical *E. savignyi*, on the form of the left hemitergite and basipodite, but the difference may prove to be only racial (subspecific).

EMBLIA TUNETANA Navás 1919. Figs. 29–31.

Mem. Pont. Accad. Romana dei Nuovi Lincei, Series ii, 5, p. 26.

Navás (l.c.) states that the type (♂), from Tunisia (coll. E. Le Moul't) is in his own collection. In the Paris Museum is a male labelled: '*Embla tuncetana* Nav.; Navás S.J. det.'; 'Tunisie. E. Le Moul't'; 'Typus' (Navás's pink manuscript type label). I assume this to be the type, transferred at some time from Navás's own collection. It serves as the basis of the following description:

♂. Length 10 mm.; head 2.0 mm. × 1.7 mm.; forewing 7 mm. × 1.9 mm.; hindwing 6 mm. × 1.8 mm. General colour (dry) dark brown, anterior part of head reddish-brown, eyes black; wing-veins dark brown, bands smoky-brown, inter-venal lines hyaline. Head (Fig. 29) as in *E. mauritanica* Lucas. Terminalia (Figs.

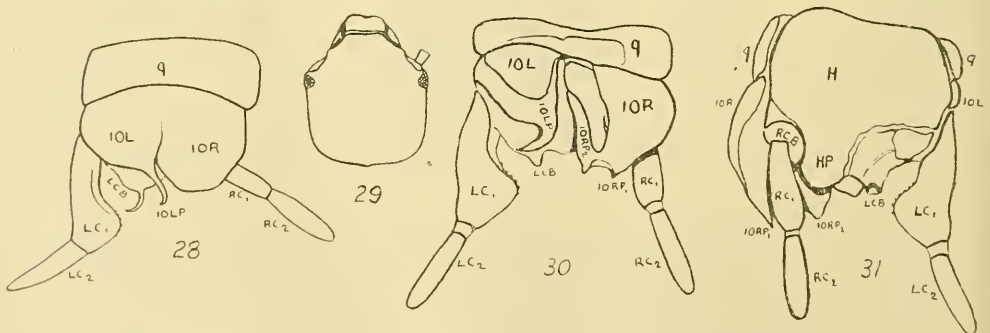


Fig. 28.—*Embla fibulatoria* Enderlein, type ♂ (after Enderlein, 1912, fig. 73). Terminalia from above, × 27.

Figs. 29–31.—*Embla tuncetana* Navás, holotype ♂. 29. Head from above, × 10. 30. Terminalia from above, × 19. 31. Terminalia from below, × 19.

30-31) distinguishable from *E. mauritanica* only in the left cercus-basipodite (LCB), which is terminally obtuse, basally directed upwards, then curved downwards.

♀ unknown.

The left cercus-basipodite may be an individual character, possibly even teratological. The study of further Tunisian specimens may indicate, however, that it is a constant character for that region, in which case the status would still probably require reduction (to a geographic race of *E. mauritanica*). Preliminary data on this problem are to be found in three males in the British Museum ('Hammam-Meskoutine, May 13-17, 1914, W.R. and K.J.'), which agree closely with the type of *E. tunetana*, the left cercus-basipodite being perhaps a little longer and more slender, but bent up, and terminally down-curved and obtuse, as in the type. A male in the British Museum (Tozeur, S. Tunisia, G. C. Champion, 1913) agrees with the above series in most characters, but has the head rather more as in *E. savignyi* (neotype), the sides behind the eyes being straighter and more convergent than in the typical form common to *E. mauritanica* and *E. tunetana*.

EMBLIA RAMBURI Rimsky-Korsakov 1905. Figs. 32-34.

Zool. Anz., 29, p. 434 (larva).—*Monotylota ramburi* (R.-Kors.), Enderlein, 1909, l.c., p. 188; 1912, l.c., p. 65.

Rimsky-Korsakov's description refers to a larva from Villefranche, French Riviera. Some knowledge of the structure of the males from this locality has been given by Friederichs (1906) and Krauss (1911, p. 57, Text-Figure C, from an unpublished figure by Friederichs; this figure is reproduced here, Fig. 32). It would be beneficial if a neotype (or allotype) male from the type locality could be collected, fully described, and lodged in some museum. The present specific concept has rather vague limits, due to the general classification as *E. ramburi* by some authors (e.g. Friederichs, 1934) of any wingless male with terminalia agreeing with the present generic concept of *Embla*, regardless of locality. Thus Friederichs (l.c.) refers *E. biroi* Krauss 1911 (infra) to '*Monotylota*' *ramburi*,

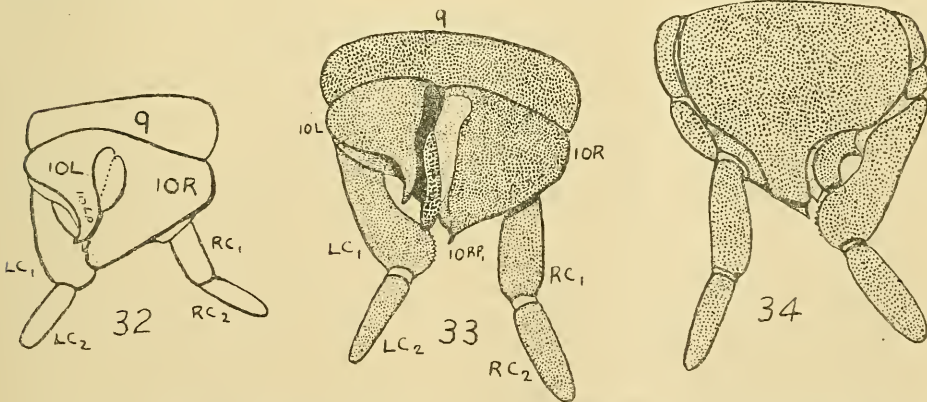


Fig. 32.—*Embla ramburi* R.-Kors., ♂ from Villefranche. Terminalia from above. Magnification not stated (after Krauss, 1911, Text-figure C, from an unpublished figure by Friederichs).

Figs. 33-34.—*Embla ramburi* Rimsky-Korsakov, ♂, Ronda, Spain (det. Rimsky-Korsakov). 33. Terminalia from above, × 40. 34. Terminalia from below, × 40. (Stippling as in figs. 26-27.)

and also identifies a male from Arabia, with different terminalia, as this species. Some wingless males, with terminalia on the general plan found in *Embia*, may be formae apterae of known winged species, and some species known only as wingless (*Monotylota* of Enderlein) may prove to possess winged forms. A general study of the Mediterranean species, from a geographic standpoint, and allowing for the unimportance of the presence or absence of wings, should give very interesting results.

I have seen no specimens from the type locality; the following description is from a male (Ronda, Spain, 2500 ft., 30.6.25, Sheppe) and female (Grazalama, Spain, 2500 ft., 29.6.25, in cork-oak woods), both determined as *E. ramburi* by Rimsky-Korsakov himself. These specimens are in the Museum of Comparative Zoology, Harvard University. The male terminalia agree sufficiently closely with descriptions of specimens from Villefranche (Friederichs, 1906, and 1923, fig. 3; Krauss, 1911, l.c.; cf. Figs. 32 and 33).

♂. Length 9 mm.; wingless. General colour very dark brown. Head rather narrow, eyes small. Hind tarsi as throughout the genus. Terminalia (Figs. 33-34) with right hemitergite as in *E. savignyi*; process of left hemitergite (10LP) much broader, and less curved, than in *E. savignyi*. First segment of left cercus (LC₁) slightly and smoothly dilated inwards distally, inner face of dilation echinulate. Left cercus-basipodite (LCB) a small plate curved outward to a subobtusate end. Other characters as in *E. savignyi*.

♀. Larger and paler. Thoracic sclerites, legs, and first abdominal sternite as in the ♂.

Note.—The additional localities listed by Krauss (1911), Enderlein (1912) and Friederichs (1934) should be treated with some doubt, until a full review of the terminalia of males from the type locality and elsewhere can be made. Further details of the colour, etc., of both sexes from the type locality can be obtained from Friederichs (1906).

Species probably synonymous with *E. ramburi* have been discussed earlier (Davis, 1939, Pt. xii of this series). They are: *Haploembia laufferi* Navás, *H. duplex* Navás, *H. codinai* Navás, *Embia cephalotes* Navás, and *E. silvano* Navás.

EMBIA ALGERICA (Navás 1930). Figs. 35-38.

Haploembia algerica Navás, 1930, *Brotéria*, Série Zoológica, xxvi, fasc. 3, p. 136, fig. 45.

The following description is from the type (Mus. Paris):

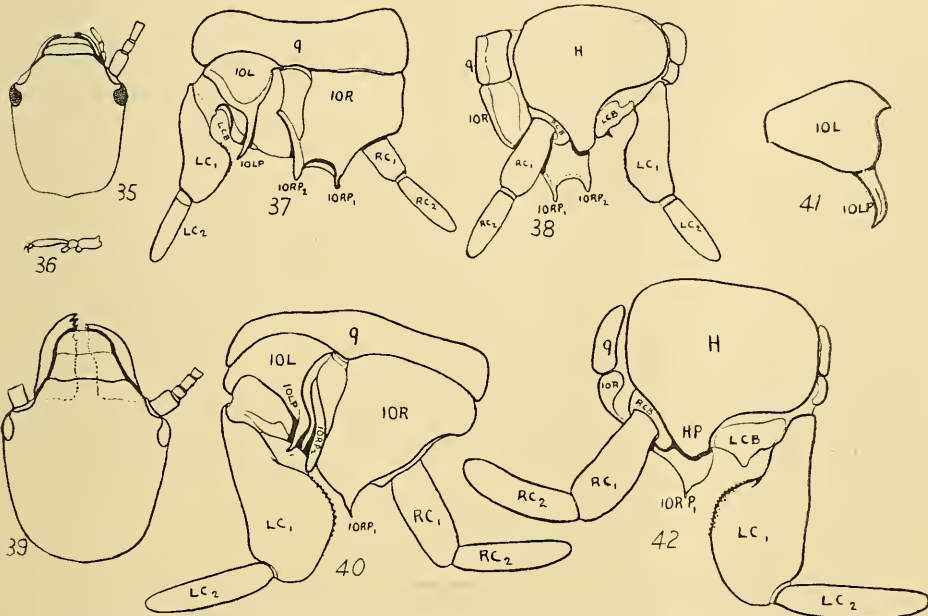
♂. Length 6.5 mm.; head 1.4 mm. × 1.0 mm.; wingless. General colour dull black, segments of legs and antennae dark brown. Head (Fig. 35) narrow, eyes small, placed far forward, sides behind eyes converging only slightly. Antennae with 14 segments (incomplete?). Hind tarsi (Fig. 36) with only one metatarsal bladder, as throughout the genus. Terminalia (Figs. 37-38) much as in *E. mauritanica*; posterior process of right hemitergite (10RP₁) obtuse, directed backward; space between 10RP₁ and inner process (10RP₂) rather extensive, concave (this may be due merely to the configuration of the parts when studied, perhaps distorted by drying or preparation). Process of left hemitergite (10LP) long, acute, much thinner than in *E. ramburi* or *E. mauritanica*, only a little curved to the left; 10LP is in this respect rather similar to the winged species *E. fibulatoria* End., also West African. First segment to left cercus (LC₁) reminiscent of *E. savignyi* (neotype specimen). Left cercus-basipodite (LCB) with left-hand part folded upwards as a long obtuse flange, and with a small subobtusate

spine near the inner limit, i.e. near the process of the hypandrium. Other structures as in *E. savignyi* and *E. mauritanica*.

♀ unknown.

Locality.—Agadir, Morocco ('Miss. Lecerf and Talbot, Grand Atlas, 28.iv. à 9.vi.1927'). In the Paris Museum there is another male with the same locality label, but without Navás's determination or type label. It is superficially similar (size, colour, etc.); time did not permit a detailed study of the terminalia.

This species appears to be quite distinct on the form of the terminalia, and the dull black coloration is exceptional. It would be interesting to compare with it males from the Canary Islands, where the genus is reputed to occur.



Figs. 35-38.—*Embia algerica* (Navás), holotype ♂. 35. Head from above, × 15. 36. Hind tarsus viewed laterally, × 15. 37. Terminalia from above, × 28. 38. Terminalia from below, × 28.

Figs. 39-42.—*Embia silvestrii*, n. sp., holotype ♂. 39. Head from above, × 20. 40. Terminalia from above, × 40. 41. Left hemitergite from above and to the left, × 40. 42. Terminalia from below, × 40.

EMBIA SILVESTRII, n. sp. Figs. 39-42.

In the Paris Museum is an alcoholic male from Ouled Messelem, Algeria, determined by Silvestri as *Embia ramburi* R.-Kors. In view of the distinct structure of the terminalia, it is described as a new species.

♂. Length 7 mm.; head 1.6 mm. × 1.1 mm.; wingless. General colour dark brown, shiny, eyes black. Head (Fig. 39) similar to the preceding species; antennae with 21 segments on each side, length 2.8 mm. Hind tarsi with one ventral bladder distally on the first segment. Terminalia (Figs. 40-42) differing from *E. ramburi* in the process of the left hemitergite (10LP), narrower and somewhat contorted, curved outward, distally acute; the left cercus-basipodite

(LCB) obtuse, directed upward; and the first segment of the left cercus (LC₁) with distal two-thirds of inner face expanded in a large rounded echinulate lobe. Other characters as in *E. ramburi*, *E. savignyi*, etc.

♀ unknown.

Locality.—Ouled Messelem, Algeria, 25/5/1893 (holotype ♂ in Muséum d'Histoire naturelle, Paris). The left cercus immediately differentiates this from any other known species of *Embia*, winged or wingless.

EMBLA BIROI Krauss 1911. Figs. 43-44.

Zoologica. Hft. 60, Bd. 23, p. 59, Pl. iii, figs. 18-18D.—*Monotyloa biroi* (Krauss), Enderlein, 1912, *Coll. zool. de Selys-Longchamps*, p. 104.

♂ (after Krauss, l.c.). Length 13-15 mm.; length of head approximately 2.3 mm.; wingless. General colour reddish-brown to dark chestnut-brown, shiny. Head broadly elliptical, rounded behind; antennae with 23 segments. Terminalia (Figs. 43-44, after Krauss, l.c., Pl. iii, figs. 18A-B) much as in *E. mauritanica*, the first segment of the left cercus (LC₁) slightly different in form (dilation less distally placed), but possibly within the range of individual variation for *E. mauritanica*. Left cercus-basipodite (according to Krauss's figures) obtuse, but according to his verbal description produced to a narrow process, acute, terminally bent hook-wise, adjacent to the penis (recte process of hypandrium).

♀. See Krauss, l.c., p. 60. Not of taxonomic importance.

Locality.—Gafsa, Tunisia, 2 ♂, 1 ♀, coll. L. Biró (Mus. Budapest, types).

Friederichs (1934, p. 409) states with assurance that the species, of which he had examined the (dried) types, is synonymous with *E. ramburi* R.-Kors. I attribute more weight to Krauss's careful figures than to this statement. According to these figures, *E. biroi* differs from *E. ramburi* in the terminalia, the most important systematic criterion. It is possible, however, that it may prove to be a forma aptera of *E. mauritanica*, which occurs in the same region; this may be decided at a later date.

EMBLA GAILLARDI Navás 1922. Figs. 45-47.

Rev. Acad. Cienc. Zaragoza, vii, p. 28.

The following re-description is from the unique type (Mus. Paris):

♂. Length 10 mm.; forewing 7 mm. × 1.7 mm. General colour pale ferruginous, eyes black; wing-veins dark brown, bordered by mid-brown bands. Head, wings and tarsi as in *E. mauritanica* (in the right forewing, R₄ is branched terminally; Fig. 45). Terminalia (Figs. 46-47) very similar to *E. savignyi* and *E. mauritanica*; left hemitergite (10L) as in the latter species, left cercus basipodite (LCB) as in the former; first segment of left cercus (LC₁) more as in *E. mauritanica* than in *E. savignyi*, the internal lobe less smoothly rounded (Fig. 46), though apparently smooth from some aspects (Fig. 47).

♀ unknown.

Locality.—Haut Dahomey: Marakou (Mission Tilho), Dr. R. Gaillard, 1910, Juillet.

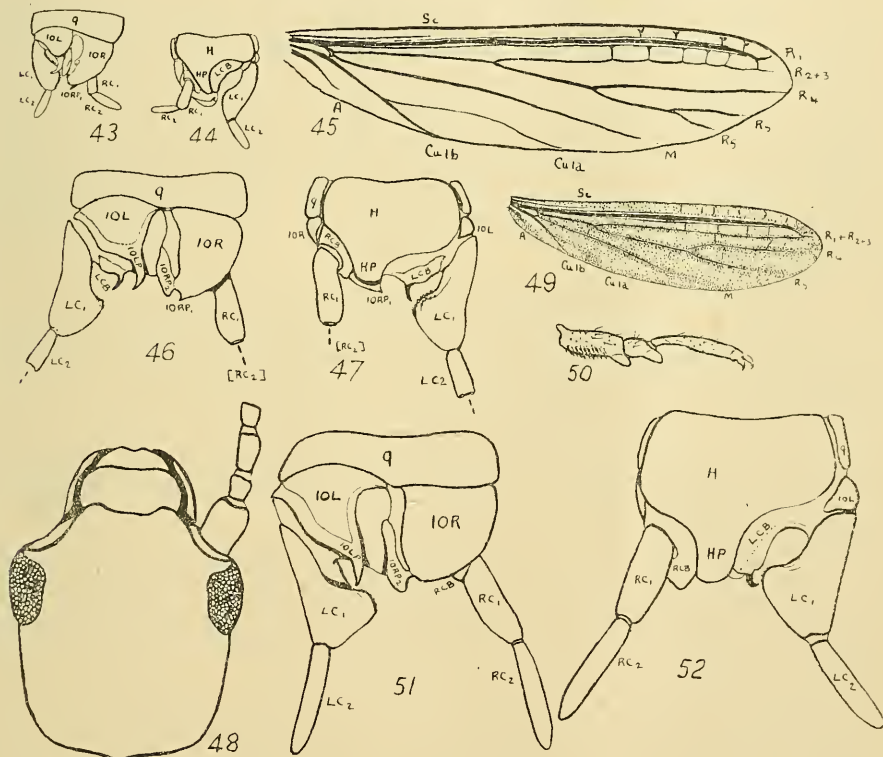
Whether this specimen is distinct from *E. mauritanica* and *E. savignyi* may well be doubted; perhaps all three, together with *E. fibulatoria* End. and some others, are races of the same species. The present course is to place on record the facts relating to the types and to leave it to future workers, assisted by further records, to weigh the taxonomic values, and the necessary status allowable to each name.

EMBLIA CHUDEAUI Navás 1922. Figs. 48-52.

Embla (Rhadadochir) chudeaui Navás, 1922, *Rev. Acad. Cienc. Zaragoza*, vii, p. 29.

The following re-description is from the unique type (Mus. Paris):

♂. Length 6 mm.; forewing 6 mm. × 1.1 mm.; hindwing 4.3 mm. × 1.1 mm.; head 1.2 mm. × 0.9 mm. General colour pale yellowish-brown, eyes black; wings with R₁ golden-brown, other veins, and narrow bordering pigment-bands, very pale brown. Head (Fig. 48) rather narrow, eyes not prominent, sides behind eyes slightly converging, smoothly rounded behind. Wings (Fig. 49) normal for the genus, except that the veins, especially Cu_{1a}, are weaker than usual. Hind tarsi (Fig. 50) normal for the genus. Terminalia (Figs. 51-52) similar in general arrangement to *E. savignyi*, but with various differences in detail, warranting specific rank; process of left hemitergite (10LP) short, little curved; first segment of left cercus (LC₁) with inner margin, distad to apex of echinulate lobe, almost



Figs. 43-44.—*Embla biroi* Krauss, holotype ♂ (after Krauss, 1911, Pl. iii, figs. 18A, B). 43. Terminalia from above. 44. Terminalia from below (magnification not stated).

Figs. 45-47.—*Embla gaillardii* Navás, holotype ♂. 45. Right forewing, × 10. 46. Terminalia from above, × 19. 47. Terminalia from below, × 19.

Figs. 48-52.—*Embla chudeaui* Navás, holotype ♂. 48. Head from above, × 35. 49. Right forewing, × 10. 50. Hind tarsus viewed laterally, × 35. 51. Terminalia from above, × 35. 52. Terminalia from below, × 35.

straight; left cercus-basipodite (LCB) with a small, slender, out-curved hook, arising from near the process of the hypandrium (HP).

♀ unknown.

Locality.—'Bassin du Moyen Niger: Bandiagara; R. Chudeau, 1909.'

Note.—In the Paris Museum is another male, identified by Navás as *E. chudeaui*; its label agrees, except that 'Doko' replaces 'Bandiagara'. It resembles the type superficially (size, colour, form of unprepared terminalia); time did not permit preparation and detailed examination of the terminalia.

E. chudeaui is probably the smallest winged species of *Embia*; this may be correlated with the weakening of the veins, especially Cu_{1a} . The structure of the terminalia, and especially the left cercus, is quite distinctive. The species obviously has no relationship to *Rhagadochir*.

EMBIA LURIDICEPS Enderlein 1912. Fig. 53.

Coll. zool. de Selys-Longchamps, fasc. 3, p. 42, fig. 18.

♂ (after Enderlein). Length 7½ mm.; length of forewing 6 mm., of hindwing 5½ mm. General colour brown, head reddish-yellow, prothorax rust-red; wings brown, with broad hyaline inter-venal lines. Head rather narrow, sides behind eyes almost straight, weakly convergent, hind angles rounded. Wings with an extra vein apparent between cubital stem and its anterior branch (' Cu_2 im Vorder- und Hinterflügel kurz und mässig scharf'*). Terminalia (Fig. 53, after Enderlein, 1912, fig. 18) with process of left hemitergite relatively longer and thinner than in *E. savignyi*; first segment of left cercus with distal half of inner margin swollen as a rounded echinulate lobe; left cercus-basipodite apparently incurved in an acute hook.

♀ unknown.

Locality.—Eritrea: Asmara (Mus. Stettin, type).

Enderlein's figure is of a specimen somewhat distorted in preparation. There is possibly a significant difference, in the form of the left cercus, from *E. collarigera* End. (infra); the other differences apparent from the figures are probably due to distortion (cf. Enderlein, l.c.).

EMBIA COLLARIGERA Enderlein 1909. Fig. 54.

Embia collariger Enderlein, 1909, *Zool. Anz.*, 35, p. 182.—*Embia collarigera* Enderlein, Krauss, 1911, *Zoologica*, Hft. 60, Bd. 23, p. 67; Enderlein, 1912, *Coll. zool. de Selys-Longchamps*, p. 109, 116.

Enderlein's original spelling '*collariger*' was summarily changed by Krauss to '*collarigera*', for agreement. If originally intended as a noun (cf. *Metoligotoma pugionifer* Davis), there seems little need for this change, but as Enderlein, after seeing Krauss's work, has (1912, Nachtrag) adopted the amended spelling, it may be retained.

♂ (after Enderlein, 1912, p. 41, fig. 17). Length 11.5 mm.; head 2.5 mm. × 2.0 mm.; length of forewing 9 mm., of hindwing 8 mm. General colour black, prothorax, underside and posterior half of dorsal surface of head, rust-red; wing-veins and bordering bands dark brown, with strong hyaline inter-venal lines. Head and wings as in *E. luridiceps*, i.e. cubitus with a weak branch between Cu_{1a} and stem. Terminalia (Fig. 54, after Enderlein, 1912, fig. 17) similar to

* Enderlein labels the vein called Cu_{1b} herein ' Cu_{st} '; an additional vein or trace, between the anterior branch (Cu_1 or Cu_{1a}) and Cu_{st} , is labelled Cu_2 .

E. luridiceps End., the first segment of the left cercus with a longer echinulate lobe, the acute termination of the left cercus-basipodite curved outwards.

♀ unknown.

Locality.—Adua, Ethiopia (type in Mus. Stettin).

The differences from *E. luridiceps*, over which this species has priority, seem very slight. There is agreement in the unusual colour and venation, and the localities are adjacent. The differences in the terminalia are exaggerated in Enderlein's figures, due to distortion in preparation; the constancy of the form of the left cercus in specimens from the type localities of the respective 'species' requires investigation.

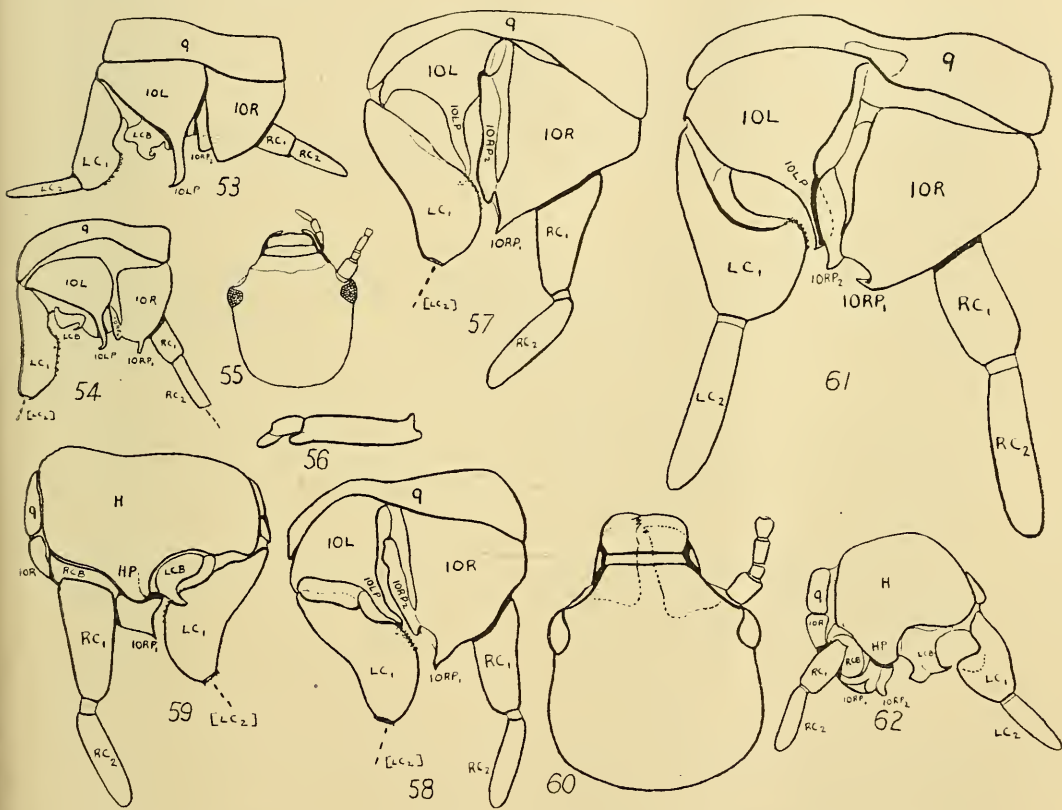


Fig. 53.—*Embia luridiceps* Enderlein, holotype ♂ (after Enderlein, 1912, fig. 18). Terminalia from above (distorted), × 19.

Fig. 54.—*Embia collarigera* Enderlein, holotype ♂ (after Enderlein, 1912, fig. 17). Terminalia from above (distorted), × 12.

Figs. 55-59.—*Embia femorata* Navás, holotype ♂. 55. Head from above, × 9. 56. First two segments of hind tarsus, viewed laterally, × 23. 57-58. Terminalia from above, slightly different aspects, × 23. 59. Terminalia from below, × 23.

Figs. 60-62.—*Embia verhoefi* Friederichs, ♂ from Caia, Zambesi. 60. Head from above, × 23. 61. Terminalia from above, × 45. 62. Terminalia from below, × 23.

EMBLIA FEMORATA Navás 1916. Figs. 55-59.

Mem. R. Acad. cienc. y artes de Barcelona, 12, no. 13, p. 22.

The following re-description is from the unique type (Mus. Congo):

♂. Length 10.5 mm.; head 2.3 mm. × 1.9 mm.; forewing 9.5 mm. × 2.0 mm.; hindwing 8.0 mm. × 2.5 mm. General colour dark brown, prothorax and all femora orange-brown, proximal abdominal tergites paler than rest of body, head especially dark, eyes black; wing-veins dark brown, bordered by smoky-brown bands. Head (Fig. 55) with eyes rather small, sides behind eyes weakly convergent, rounded behind. Antennae incomplete. Venation: According to my somewhat hasty notes, the venation is normal for the genus, *i.e.* the cubitus has not the extra branch found in *E. luridiceps* and *E. collarigera*, closely related species. This point requires checking. R_{4+5} with fork longer than stem; cross-veins rather numerous; no aberrations. Hind tarsi (Fig. 56) with only one metatarsal bladder, the metatarsus longer than in *E. savignyi*, *E. mauritanica*, etc. Terminalia (Figs. 57-59) agreeing closely with *E. collarigera* and *E. luridiceps*; process of left hemitergite (10LP) less acute terminally, and more sinuous; first segment of left cercus (LC_1) with inner echinulate dilation occupying central one-third of segment; left cercus-basipodite (LCB) curved outward, acute.

♀ unknown.

Locality.—Mufungwa Sampwe, Congo, 1-16.xii.1911, Dr. Bequaert.

Further research may prove that this species, *E. collarigera* and *E. luridiceps* are synonymous, or that they are races of one species. The present figures (57-59) cannot be compared closely with Enderlein's figures of the other species (54, 53), as the latter are made from distorted terminalia.

EMBLIA VERHOEFFI Friederichs 1907. Figs. 60-62.

Verh. Zool. bot. Ges. Wien, 57, p. 273.

This species has been well re-described from the type (Portuguese East Africa; Mus. Berlin) by Enderlein (1912, p. 43, fig. 19). Friederichs (1923, p. 11, and Pl. i, fig. 1) gives a further figure of the type, showing the structure of the head and the venation.

The following description is of two males from Caia, Zambesi (coll. H. Swale, on flowers, 15.7.1911; British Museum), which agree in all respects with the descriptions and figures cited above.

♂ (dry). Length 9-11 mm.; head 1.6 mm. × 1.3 mm.; forewing 6.0-7.5 mm. × 1.3-1.7 mm.; hindwing 5.0-6.5 mm. × 1.3-1.7 mm. (The type, after Enderlein, *i.e.*, is slightly larger: Length 11.5 mm., length of forewing 9 mm., of hindwing 8 mm.) General colour dark brown, eyes black, prothorax orange-brown, rather bright. Wings with dark brown veins bordered by smoky-brown bands, intervenal lines broad, hyaline. Head (Fig. 60) broad, slightly expanded behind eyes, which are relatively small. Wings with fork of R_{4+5} subequal to stem in length; cubitus two-branched as in *E. mauritanica*. Hind tarsi as in *E. savignyi*, etc. Terminalia (Figs. 61-62) with posterior process of right hemitergite (10RP₁) short and acute, directed inward; process of left hemitergite (10LP) rather short and broad, acute, curved slightly to the left. First segment of left cercus (LC_1) very characteristic, third quarter dilated inward, echinulate; inner margin basad to dilation strongly excavate longitudinally, and concave in dorsal view. Left cercus-basipodite (LCB) curved to the left into an acute process, and with a flat lobe on the right directed towards the process of the hypandrium (HP). Other structures as throughout the genus.

♀. A very large female (length, dry, 20 mm.; head 3.2 mm. × 2.5 mm.), in the British Museum (Caia, Zambesi, 28.6.11, H. Swale), may possibly be referable to this species; this may be doubted from the colour (brown, prothorax concolorous). It is the largest member of the Order seen by me.

Locality.—Portuguese East Africa, coll. W. Tiesler (type ♂, Mus. Berlin); Caia, Zambesi (2 ♂, British Museum).

EMBLIA SABULOSA Enderlein (1908). Figs. 63–66.

Olyntha sabulosa Enderlein, 1908, *Denkschr. med. naturw. Ges. Jena*, 13, p. 347, figs. 1–2.—*Embla sabulosa* Enderlein, 1909, *Zool. Anz.*, 35, p. 180; Krauss, 1911, *Zoologica*, 23, Hft. 60, p. 65; Enderlein, 1912, *Coll. zool. de Selys-Longchamps*, fasc. 3, p. 45, figs. 21–22.

♂ (after Enderlein, 1912). Length 7.5–8.5 mm.; head 1.6 mm. × 1.1 mm.; forewing 5.5 mm. × 1.5 mm.; hindwing 5.1 mm. × 1.5 mm. General colour black, some sclerites dark brown (antennae, cerci, anterior parts of abdomen); wings with dark brown veins bordered by rather dark brown bands, inter-venal lines narrow, hyaline. Wings as in *E. mauritanica* (cf. Enderlein, 1912, fig. 23). Terminalia (Fig. 63, after Enderlein, 1912, fig. 22) similar to *E. savignyi*; process of left hemitergite (10LP) slightly longer and less curved, first segment of left cercus (LC₁) with inner dilation rather sharp, with a longitudinal channel basally.

♀ (after Enderlein, l.c.). Length 10–11 mm.; general colour dark brown.

Locality.—Kubub, Great Namaqualand, S.W. Africa. (types in Berlin and Stettin Museums).

In the British Museum is a male labelled 'S.W. Africa. Ovamboland. Kunene River (S. bank). March 1923. K. H. Barnard.' It appears to be referable to *E. sabulosa*. It approaches *E. savignyi* rather more closely than do the types (to judge from Enderlein's figures); this, and its more northerly locality, suggest that *E. sabulosa* may be a southern race of *E. savignyi*. Full particulars are as follows:

Length 10.5 mm.; head 1.9 mm. × 1.5 mm.; forewing 7.5 mm. × 1.7 mm.; hindwing 6.5 mm. × 1.7 mm. General colour very dark brown. Head (Fig. 64) with rather small eyes, sides behind eyes sinuous. Wings as in the types, except that M is clearly forked in the left forewing. Terminalia (Figs. 65–66) as in Enderlein's figure of a typical example, but with the inner face of the first segment of the left cercus (LC₁) smoother. The apparent differences in the right hemitergite (cf. Figs. 63, 65) are probably due only to orientation at the time the figures were prepared.

EMBLIA PRODUCTA, n. sp. Figs. 67–69.

♂. Length 9 mm.; head 2.0 mm. × 1.7 mm.; forewing 7 mm. × 2 mm.; hindwing 6 mm. × 1.8 mm. General colour very dark brown, eyes black, wing-veins dark brown bordered by dark smoky-brown bands. Head (Fig. 67) similar in general outline to *E. mauritanica*, slightly narrowed behind eyes. Antennae with 25 segments, length 5 mm. Wings as in *E. mauritanica*; tarsi normal for the genus. Terminalia (Figs. 68–69) similar to *E. savignyi*, but with the first segment of the left cercus (LC₁) produced inwards medially to a strong echinulate beak, longer than thick, obtusely rounded terminally.

♀ unknown.

Locality.—Mogadiscio, Italian Somaliland, iv.1937, N. Cambiaso (holotype ♂, Museo Civico di Storia Naturale, Genoa).

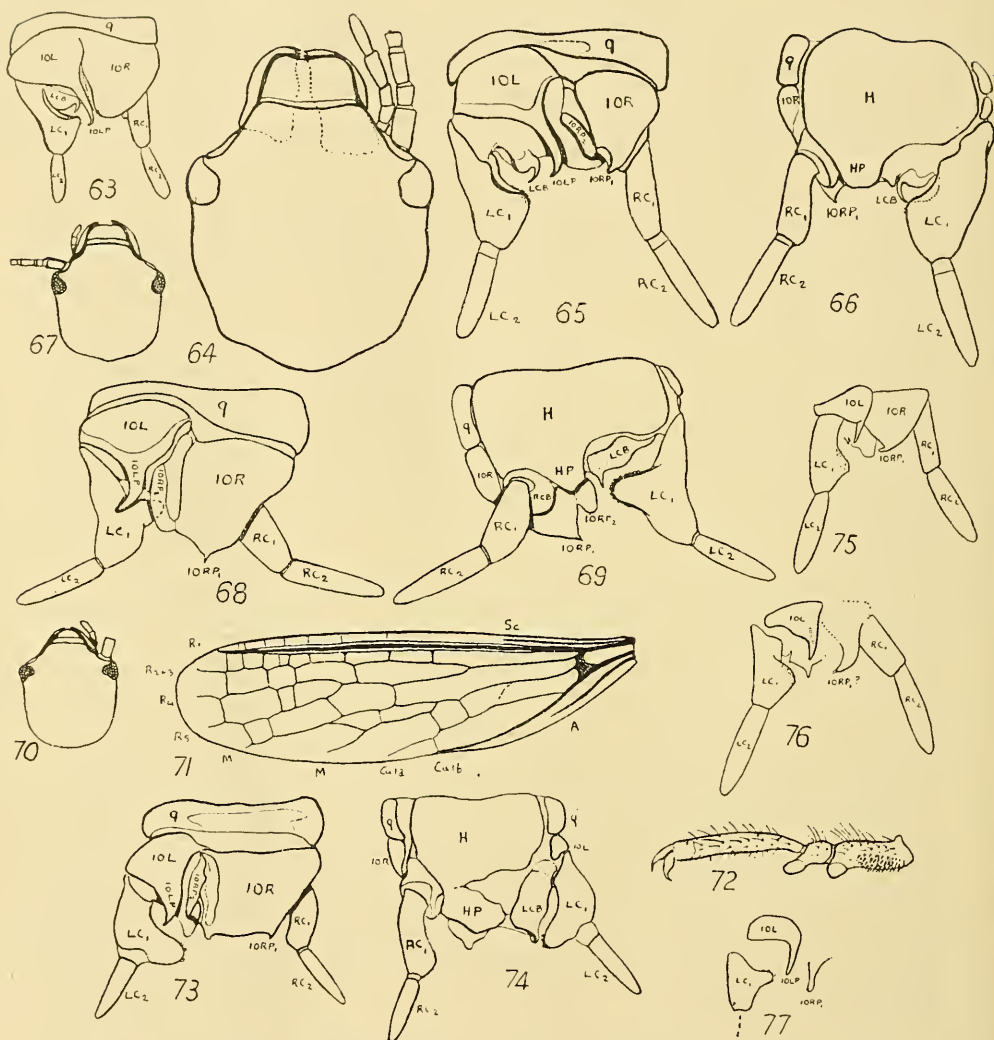


Fig. 63.—*Embia sabulosa* Enderlein, type ♂ (after Enderlein, 1912, fig. 22). Terminalia from above, $\times 18$.

Figs. 64-66.—*Embia sabulosa* Enderlein, ♂ from Ovamboland. 64. Head from above, $\times 23$. 65. Terminalia from above, $\times 23$. 66. Terminalia from below, $\times 23$.

Figs. 67-69.—*Embia producta* n. sp., holotype ♂. 67. Head from above, $\times 9$. 68. Terminalia from above, $\times 23$. 69. Terminalia from below, $\times 23$.

Figs. 70-74.—*Embia ramosa* Navás, holotype ♂. 70. Head from above, $\times 9$. 71. Left forewing, $\times 9$. 72. Hind tarsus viewed laterally, $\times 32$. 73. Terminalia from above, $\times 17$. 74. Terminalia from below, $\times 17$.

Fig. 75.—*Embia aethiopicorum* Karsch, holotype ♂ (after Enderlein, 1912, fig. 16). Terminalia from above (distorted), $\times 11$.

Fig. 76.—*Embia cameruncensis* Verhoeff, holotype ♂ (after Enderlein, 1912, fig. 20). Terminalia from above (distorted), $\times 17$.

Fig. 77.—*Embia dissimilis* Rimsky-Korsakov, holotype ♂ (after Rimsky-Korsakov, 1924). Parts of terminalia from above. Magnification not stated.

The structure of the left cercus clearly differentiates this species from *E. savignyi*, which is related structurally on other characters, and which has an adjacent geographic range.

EMBIA RAMOSA Navás 1923. Figs. 70-74.

Rev. Acad. Cienc. Zaragoza, viii, p. 11, fig. 2.

The following re-description is from the unique type (Mus. Paris):

♂. Length 11 mm.; head 1.8 mm. × 1.5 mm.; forewing 8 mm. × 1.8 mm.; hindwing 7 mm. × 1.8 mm. General colour very dark brown, wings dark smoky-brown with hyaline inter-venal lines. Head (Fig. 70) much as in *E. producta*. Wings with R_{4+5} forked, M forked in left forewing (Fig. 71), simple in other wings; cross-veins numerous, one oblique, joining branches of M, in left forewing; anterior branch of cubitus (Cu_{1a}) simple, but with a cross-vein terminally connecting it to the stem (Cu_{1b}) in left forewing and right hindwing; in the right hindwing an oblique cross-vein also connects Cu_{1a} to M, and resembles an extra anterior branch of Cu_{1a} . Tarsi (Fig. 72) as in *E. savignyi*. Terminalia (Figs. 73-74) more aberrant than any other species included in *Embia*; inner process of right hemitergite ($10RP_2$) with a small triangular sclerite distally; posterior border of right hemitergite ($10R$) broad and concave between $10RP_2$ and posterior process ($10RP_1$). Process of left hemitergite ($10LP$) very broad, tapered, subacute, slightly curved to the left, not delimited from the body of the hemitergite ($10L$) by any boundary. First segment of left cercus (LC_1) terminally produced inward to a long obtuse lobe, with a few (some 3-4) small nodules terminally. Hypandrium (H) with a broad posterior process (HP), separated from H in its left-hand part by membrane (possibly due to breakage); left cercus-basipodite (LCB) tapered posteriorly, obtuse, rotated about longitudinal axis.

♀ unknown.

Locality.—Mozambique: 'Vallée du Revoué, env. d'Andrada, G. Vasse, 1905, Octobre.'

This species is possibly distinct from *Embia*, at least subgenerically.

Species insufficiently known.

The following three species, from Johann-Albrechts-Höhe, Cameroons, are very probably synonymous, but the existing figures do not decide this point with certainty, nor do they give a clear picture of the relationship to other species:

EMBIA AETHIOPICORUM Karsch, 1900, *Ent. Nachr.*, 26, p. 79.

The terminalia have been figured by Enderlein (1912, fig. 16, from the type ♂, Mus. Berlin); this figure is reproduced here (Fig. 75); the various parts of the terminalia are obviously much distorted. Verhoeff (1904, Pl. 3, fig. 16) gives a careful figure of part of the terminalia of the type; the left cercus-basipodite is suggestive of *E. tunetana* Nav.

EMBIA CAMERUNENSIS Verhoeff, 1904, *Abh. Leop.-Carol. Ak. Naturf. Halle*, Bd. 82, p. 202.

The terminalia of the type ♂ (Mus. Berlin) have been figured by Enderlein (1912, fig. 20; reproduced here, Fig. 76). The same remarks apply as to *E. aethiopicorum*. Verhoeff's figure of the left hemitergite (l.c., Pl. 4, fig. 24) tends to emphasize the structural similarity to *E. aethiopicorum*. Verhoeff apparently differentiated *E. camerunensis* from this species by size only.

EMBIA DISSIMILIS Rimsky-Korsakov, 1924, *Ent. Mitt.*, xiii, 1, p. 5, figs. a-c.

Rimsky-Korsakov's figures of the terminalia (reproduced here, Fig. 77) do not seem to have been made with his usual care and accuracy. It is difficult to compare the figure with either of the above. The type is probably in the Berlin Zoological Museum; the data are: 'L. Conradt, N. Kameroons, Johann-Albrechts-Höhe, 1896.' Rimsky-Korsakov notes that it resembles *E. aethiopicorum*, but is smaller, and the terminalia differ from Enderlein's figure of that species.

It is possible that over-maceration of the specimens figured by Enderlein accounts for their difference *inter se*, and for the difference in the left cercus from Rimsky-Korsakov's figure. The synonymy and true structure of this series may be decided by future research. The differences in length of the types of the three 'species' (15 mm., 10 mm., 8 mm.) do not represent a greater difference than that noted in Lucas's single type series of *E. mauritanica*; the general colour of the three specimens (dark brown) offers no basis for distinction, even if colour could be allowed as a taxonomic criterion in this Order.

Species incorrectly referred to Embia.

Many species incorrectly referred to *Embia* have been dealt with already in this series. The following Neotropical species, not yet considered, are generically distinct, and will be considered in the next part of this series:

Embia brasiliensis (Griffith and Pidgeon) Enderlein, *E. ruficapilla* (Burmeister) Enderlein, *E. klugi* Rambur, *E. mülleri* Hagen, *E. batesi* M'Lachlan, *E. salvini* M'Lachlan, *E. birabeni* Navás, *E. wagneri* Navás, *E. piquetana* Navás.

Unrecognizable species.

The following species, whilst probably referable to *Embia*, are unrecognizable specifically on the existing descriptions:

Embia kraussi Krausse, 1911, *Int. Ent. Zeitschr. (Guben)*, v, 9, p. 64.—This species was described from females and larvae from Asuni, Sardinia. It might be established by collection of males from that locality, but may well prove synonymous with *E. ramburi* R.-Kors. (see also Rimsky-Korsakov, 1924, p. 5, and Friederichs, 1934, p. 409).

Embia kraussi Enderlein, 1912, *Coll. zool. de Selys-Longchamps*, fasc. 3, p. 113.—Described from a female from Tanganyika, this species is of course unrecognizable, and is also a homonym.

Embia vayssièrei Navás, 1934, *Brotéria. Série trimestral*, iii, fasc. 1, p. 19.—Described from a female, this species is unrecognizable; it may possibly be established by the collection of males from the exact locality (Senegal: M'Bambey; cf. Vayssièr, 1934, who states that the insect is very common in this locality).

Embia smaeleni Navás, 1923, *Rev. Acad. Cienc. Zaragoza*, viii, p. 12.—This species was erected on a male, from Elisabethville, Congo, of which the abdomen was lacking. As numerous species of Embioptera inhabit this territory, the species can hardly be established, even by examination of the defective type (reputed to be in Navás's Collection), as, lacking the terminalia, it is unlikely that it could be identified with further specimens collected from the type locality, if such a series could be obtained.

Embia femoralis Navás, 1931, *Rev. Zool. Bot. africaines*, 21, fasc. 2, p. 133.—There is nothing in Navás's description of this specimen, from the Congo, to distinguish it from *E. femorata* Navás 1916 (supra), also from the Congo. It is probably synonymous, as well as nearly homonymous. The type (Mus. Congo) requires examination to decide this point.

Embia fuentei Navás, 1918, *Mem. R. Acad. cienc. y artes de Barcelona*, xiv, no. 4, p. 22 (358).—The species is unrecognizable from Navás's description. The locality is Pozuelo de Calatrava, Ciudad Real, Spain; the type ♂ is (or was) in Navás's Collection. It may be conspecific with a male (Mus. Madrid), also winged, from Cartagena, Spain, determined by Krauss (1911, p. 62) as *E. mauritanica* Lucas.

Full details of winged specimens from this region, especially of the terminalia, would be of interest. They may represent winged forms of species now only known as wingless (e.g. *E. ramburi* R.-Kors.).

Note.—In view of the fact that the specific differences in this genus are represented by slight variations in shape of the components of the complex terminalia, no satisfactory verbal key to the species can be prepared. This emphasizes the absolute necessity for accurate figures of the terminalia in future descriptions of new species.

It would be premature at the present stage to enter into any detailed discussion of the relationships of the different species, especially as so many of the facts, particularly those relating to the Circum-Mediterranean species, are at present in a very vague state.

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XVII. A NEW NEOTROPICAL GENUS PREVIOUSLY CONFUSED WITH
EMBIA LATREILLE.

(Forty-one Text-figures.)

Genus *EMBOLYNTIA*, n. gen.

Genotype, *Olyntha brasiliensis* Griffith and Pidgeon, 1832, The Animal Kingdom arranged in conformity with its Organization, by the Baron Cuvier, with Supplementary Additions to Each Order, Vol. 15 (Insects, Vol. 2), p. 347.—(*Embius* ? *brasiliensis* Griffith and Pidgeon 1831, Pl. 72 of the above work, issued separately). Ex Gray MSS.—(*Embius*? Griffith and Pidgeon 1831, l.c. Not *Embia* Latreille 1829.—*Olyntha* Griffith and Pidgeon 1832, l.c. Not *Olynthus* Hübner 1818 (Coleoptera)).

Neotropical Embioptera, the males with the following characters: Winged, R_1 usually confluent subterminally with R_{2+3} ; R_{4+5} forked; M simple; Cu_{1a} simple. All veins well developed, cross-veins rather numerous. First segment of hind tarsus with a terminal ventral bladder, and with a rather small conical bladder medially on the ventral surface. Tenth abdominal tergite completely divided longitudinally; right hemitergite with inner margin produced forward towards ninth tergite as a heavily-sclerotized lobe (not, as in *Embia*, with a flat elliptical flap of chitin separated except at posterior limit by membrane). Process of left hemitergite simple (i.e. not bifid, though it may carry accessory spines). Inner margin of left hemitergite, basad to process, bearing to the left before reaching ninth tergite. First segment of left cercus with a prominent echinulate lobe on inner margin. Second segment of each cercus long and rather thin, but liable to appear thicker by flattening and distortion.

The genus differs from *Embia* in the hind tarsi and in the terminalia; the latter have reached a stage of specialization from more generalized ancestors somewhat similar to that reached by *Embia*, but are, in detailed structure, clearly separable generically.

An additional difference, noted by Griffith and Pidgeon (l.c.) and Westwood (1837, p. 373), is that the antennae are very much elongated (in *Embia*, less than 26 short segments, usually about 20; in *Embolyntha*, approximately 30, segments longer). This is of little use as a criterion for preserved specimens, as the antennae are usually broken.

Griffith and Pidgeon (l.c.) noted that the segments of the maxillary palps are broader than in *Embia*. This difference seems to apply only to the genotype, *E. brasiliensis*, being therefore specific rather than generic. Westwood (1837, p. 373) incorrectly states that this species has 4-segmented maxillary palps.

EMBOLYNTHA BRASILIENSIS (Griffith and Pidgeon 1831-2). Figs. 1-7.

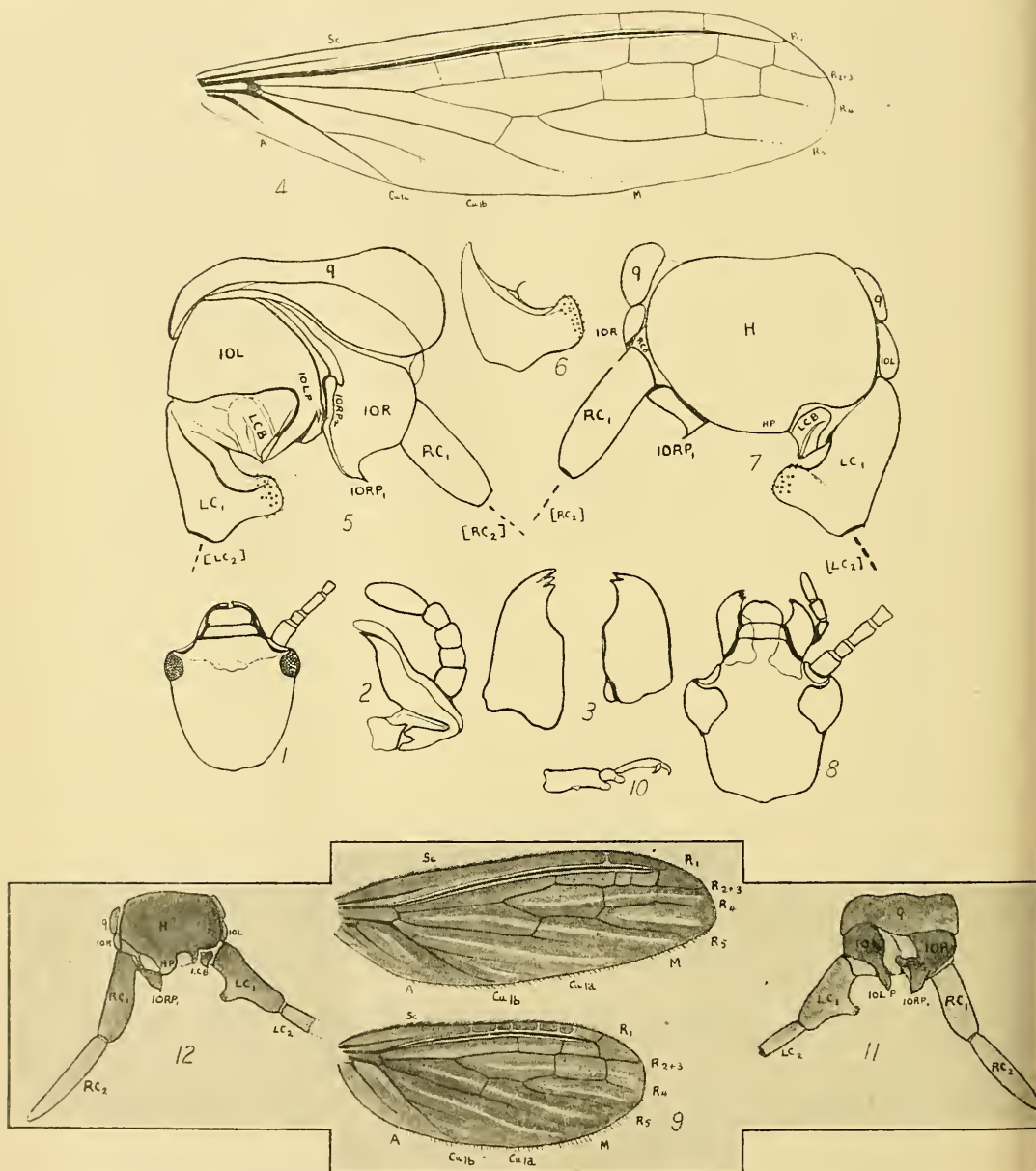
Olyntha brasiliensis Griffith and Pidgeon 1832, l.c. (*Embius* ? *brasiliensis* Griffith and Pidgeon 1831, l.c.).

♂ (holotype, Children Collection, British Museum of Natural History). Length 15 mm.; head 2.9 × 2.4 mm.; hindwing 11 × 3 mm.; end of forewing abraded, breadth as for hindwing. General colour (dry) dark chocolate-brown, prothorax and forelegs (except tibiae and tarsi) orange-brown, wing-veins dark brown with bordering bands mid-brown, inter-venal lines hyaline. Head (Fig. 1) with sides behind eyes convergent, rounded. Right antenna incomplete; left 11 mm. long, with 32 segments. Maxilla (Fig. 2) with 5-segmented palp, segments rather thicker than in other members of the Order. Mandibles incurved, the left with three, the right with two acute teeth (Fig. 3). Wings (Fig. 4) as in the generic description. Hind legs missing; the tarsal bladders are presumably the same as in related species (*infra*). Terminalia (Figs. 5-7) with right hemitergite (10R) produced posteriorly to an acute process (10RP₁), directed outward and downward; inner margin of 10R produced forward, and thickened, as a strong lobe (10RP₂), rounded in front. Left hemitergite (10L) produced inward, curving round posteriorly to an acutely-tapered process (10LP). Two minute hooks arise basally from the inner margin of 10LP. First segment of right cercus (RC₁) subcylindrical, arising from a small basipodite (RCB); second segment now lacking in both cerci of the type, subcylindrical according to the early figures of this specimen (l.c.). First segment of left cercus (LC₁) produced inward subterminally in a strong, rather square, echinulate lobe; inner margin, basad to lobe, longitudinally grooved. Hypandrium (H) smoothly rounded posteriorly, with a small bay on the left-hand side of the posterior margin, in which is lodged the left cercus-basipodite (LCB). LCB obtusely tapered behind, chitinization weakened in a median longitudinal membranous slit.

♀ unknown.

Locality.—Brazil (detailed locality not known).

Note.—The specimen (♂) figured by Enderlein (1912, fig. 24) as *Embia brasiliensis* seems to be conspecific; differences in Enderlein's figure may be due to the personal equation in figuring. Enderlein's identification seems to have been a lucky coincidence, as he had not seen the type, and the original description contains nothing to differentiate it from other Neotropical species. The locality of Enderlein's specimen is Brazil (detailed locality not known).



Figs. 1-7.—*Embolyntha brasiliensis* (Griffith et Pidgeon), holotype ♂. 1. Head from above, $\times 8$. 2. Right maxilla from above, $\times 20$. 3. Mandibles from above, $\times 20$. 4. Right hindwing, $\times 7$. 5. Terminalia from above, $\times 20$. 6. First segment of left cercus viewed more from the left, $\times 20$. 7. Terminalia from below, $\times 20$.

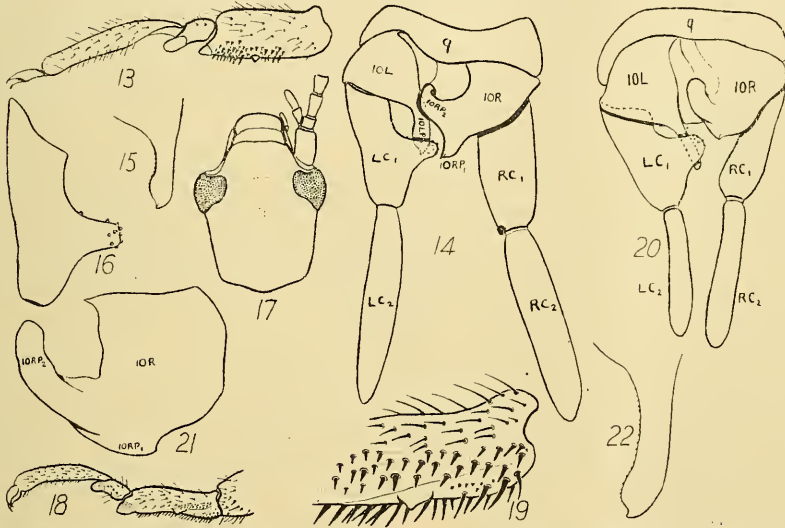
Figs. 8-12.—*Embolyntha batesi* (M'Lachlan), holotype ♂. 8. Head from above, $\times 20$ (slightly distorted by flattening). 9. Right fore- and hindwing, $\times 8$. 10. Hind tarsus viewed laterally, $\times 20$. 11. Terminalia from above, $\times 20$. 12. Terminalia from below, $\times 20$.

EMBOLYNTHA BATESI (M'Lachlan 1877). Figs. 8-27.

Embia batesi M'Lachlan, 1877, *J. Linn. Soc. London, Zool.*, xiii, no. 70, p. 380.

The following re-description is from the holotype ♂ (M'Lachlan Collection, British Museum of Natural History):

♂. Length 9 mm.; head 1.4 × 1.1 mm.; forewing 6.5 × 2.2 mm.; hindwing 5.5 × 2.2 mm. General colour very dark brown; wings with dark brown veins bordered by broad smoky-brown bands, inter-venal lines narrow, hyaline. Head (Fig. 8) with large prominent eyes; sides behind eyes converging posteriorly, smoothly rounded behind. Mandibles as in *E. brasiliensis*; segments of maxillary palps less thickened. Antennae incomplete, the left with 18 segments (last three pale). Wings (Fig. 9) very broad, with a fringe on posterior margin; venation normal for the genus, except that R_1 is not terminally confluent with R_{2+3} , but gives off a twig to the margin, and a strong cross-vein to R_{2+3} . Right forewing of type with a second anal vein. Hind tarsi (Fig. 10) as in generic diagnosis. Terminalia (Figs. 11-12) with posterior process of right hemitergite ($10RP_1$) broad, tapered,



Figs. 13-16.—*Embolyntha batesi* (M'Lachlan), ♂ from Espirito Santo, Brazil (M'Lachlan Collection). 13. Hind tarsus viewed laterally, × 42. 14. Terminalia from above, × 30. 15. Process of left hemitergite from above, × 42. 16. First segment of left cercus from above, × 42.

Figs. 17-22.—*Embolyntha batesi* (M'Lachlan), ♂ from Barro Alto, Brazil (Museum of Comparative Zoology). 17. Head from above, × 12. 18. Hind tarsus viewed laterally, × 22.5. 19. Basal half of first segment of hind tarsus, viewed laterally, × 48. 20. Terminalia from above, × 22.5. 21. Right hemitergite from above, × 48, posterior process curved down, partly concealed. 22. Process of left hemitergite from above, × 48.

(All figures based on camera lucida outlines except Figs. 38-41, which were prepared with constant use of an ocular micrometer. Conventional lettering for venation. Setae omitted except in Figs. 13, 18, 19, and the wing-fringe of Fig. 9. Shading in Fig. 9 to represent pigmentation; shading or stippling in Figs. 11, 12, 29 and 31 to represent degree of sclerotization and pigmentation. 9, ninth abdominal tergite; 10L, 10R, left and right hemitergites of tenth abdominal segment; 10LP, process of 10L; 10RP₁, 10RP₂, posterior and inner processes of 10R; LC₁, LC₂, RC₁, RC₂, first and second segments of left and right cerci; LCB, RCB, left and right cercus-basipodites; H, hypandrium; HP, process of H.)

directed inward and backward; inner process (10RP₂) a broad rounded knob directed forward, slightly incurved terminally. Left hemitergite (10L) produced back to a rather broad, tapered process (10LP), subacute, slightly expanded subterminally. Right cercus with two elongate subcylindrical segments (RC₁, RC₂); right cercus-basipodite small, distally largely membranous. First segment of left cercus (LC₁) with inner margin medially produced to a prominent obtuse beak, armed with about ten nodules; second segment (LC₂) subcylindrical (damaged in type). Hypandrium (H) produced backward to the right of the mid-line to a blunt process (HP); space between HP and base of LC₁ membranous, with a small bar projecting from the hypandrium, and a distinct basipodite (LCB), subtriangular, terminally acute.

♀ unknown.

Locality.—Brazil ('Amazons', after M'Lachlan; exact locality uncertain); coll. Bates.

Variation and Distribution.—A series of males in the M'Lachlan Collection,* from Espírito Santo (Brazil), are referable to this species. The details of this series are: Length 9.8–10.5 mm.; head 1.5–1.6 × 1.2 mm.; forewing 9.2–9.8 × 2.5–2.7 mm.; hindwing 7.5–7.8 × 2.4–2.6 mm. General colour dark golden-brown, head, meso- and metascutum, and legs, paler, eyes black, wings as in the type. Hind tarsus (Fig. 13) and terminalia (Figs. 14–16) as in the type. The antennae are up to 6.4 mm., with up to 23 segments.

In the Museum of Comparative Zoology, Harvard University, are two males (Barro Alto, Est. Minas, Brazil, coll. José Blaser, —xi.1931). They are slightly larger than the specimens detailed above (length 11–13 mm.; head 1.8–2.0 × 1.4–1.5 mm.; forewing 9.5–10.0 × 2.2–2.5 mm.), and the head (Fig. 17) somewhat narrower, but the colour, venation, hind tarsi (Figs. 18–19), and terminalia (Figs. 20–22) agree closely. The antennae are incomplete, but even so reach a length of 7.5 mm. (22 segments).

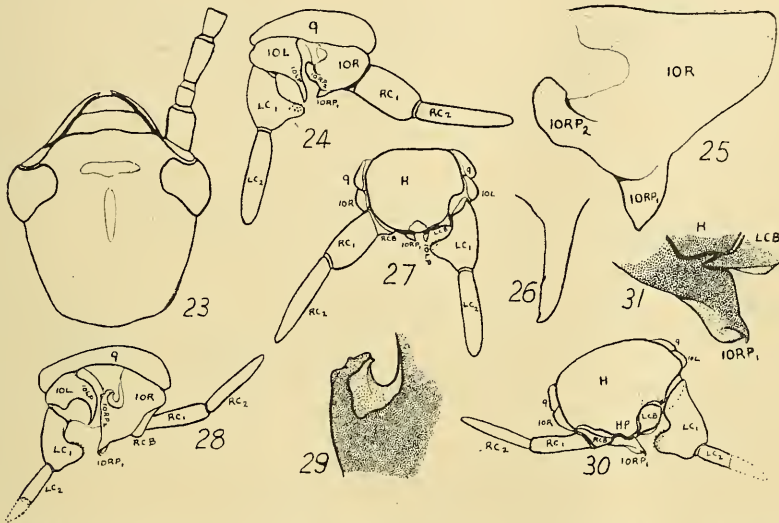
The male from which Enderlein (1912, p. 49, figs. 25–26) re-described *Olyntha ruficapilla* Burmeister (1839, Handbuch der Entomologie, vol. ii, p. 770), is from San João del Rey, Brazil (Mus. Berlin). It shows some similarity to the present species. Burmeister's original description was merely 'Fusca, capite cum pronoto rufo; alis albo-striatis; cercis fuscis; long. 3½. Brasilien'. Unless his original types (which may be at Halle) can be discovered and re-described, the name must remain unrecognizable.

Two males, from which Hagen (1885, pp. 176–178) re-described *Olyntha ruficapilla*, are in the Museum of Comparative Zoology. One is from Brazil ('from the collection of the late Dr. Schneider; . . . it may have belonged to the same lot with Burmeister's types and those in the Berlin Museum,† but it has not been compared with them'—Hagen, l.c.); the other from Venezuela, coll. Appun. The former has some similarity to *E. batesi*, but is not identical; it agrees more closely with Enderlein's specimen (supra). The differences from *E. batesi* lie in the head (Fig. 23), which is more narrowed behind, and in the terminalia (Figs. 24–27), which have the process of the left hemitergite (10LP) evenly tapered (not slightly expanded subterminally as in the type of *E. batesi*), and the dilation of the first segment of the left cercus (LC₁) more distal in position.

* Not handled by M'Lachlan when his description was framed; he states (1877, p. 380): 'I have one example, collected by Mr. Bates on the Amazons'.

† Presumably the specimen from San João del Rey (coll. Sello), described by Enderlein (supra). The identity with Burmeister's type series is merely conjecture.

Hagen's other specimen, from Venezuela, is not at all closely related to *E. batesi*, but in view of the fact that the head is missing, and the exact locality unknown, it should not be named. The terminalia (Figs. 28-31) have numerous points of difference; the inner process of the right hemitergite (10RP₂; Fig. 29) is roughened, somewhat reminiscent of the unrelated genus *Notoligotoma*; the posterior process of the right hemitergite (10RP₁; Fig. 31) has an acute out-curved extremity, and an obtuse subterminal flange on the right; the process of the left hemitergite (10LP; Fig. 28) is broad, curved, evenly-tapered, and acute terminally; and the first segment of the left cercus (LC₁) has the internal echinulate lobe massive and subterminal.



Figs. 23-27.—*Embolyntha batesi* (M'Lachlan), var., ♂ from Brazil. (Identified by Hagen as *Olynytha ruficapilla* Burmeister. Museum of Comparative Zoology.) 23. Head from above, × 20. 24. Terminalia from above, × 20. 25. Right hemitergite from above, × 70. 26. Process of left hemitergite from above, × 70. 27. Terminalia from below, × 20.

Figs. 28-31.—*Embolyntha* sp. indet., ♂ from Venezuela. (Identified by Hagen as *Olynytha ruficapilla* Burmeister. Museum of Comparative Zoology.) 28. Terminalia from above, × 20. 29. Inner process of right hemitergite, viewed from above, × 70. 30. Terminalia from below, × 20. 31. Posterior process of right hemitergite, and extremities of left cercus-basipodite and process of hypandrium, from below, × 70.

EMBOLYNTHA SALVINI (M'Lachlan 1877). Figs. 32-37.

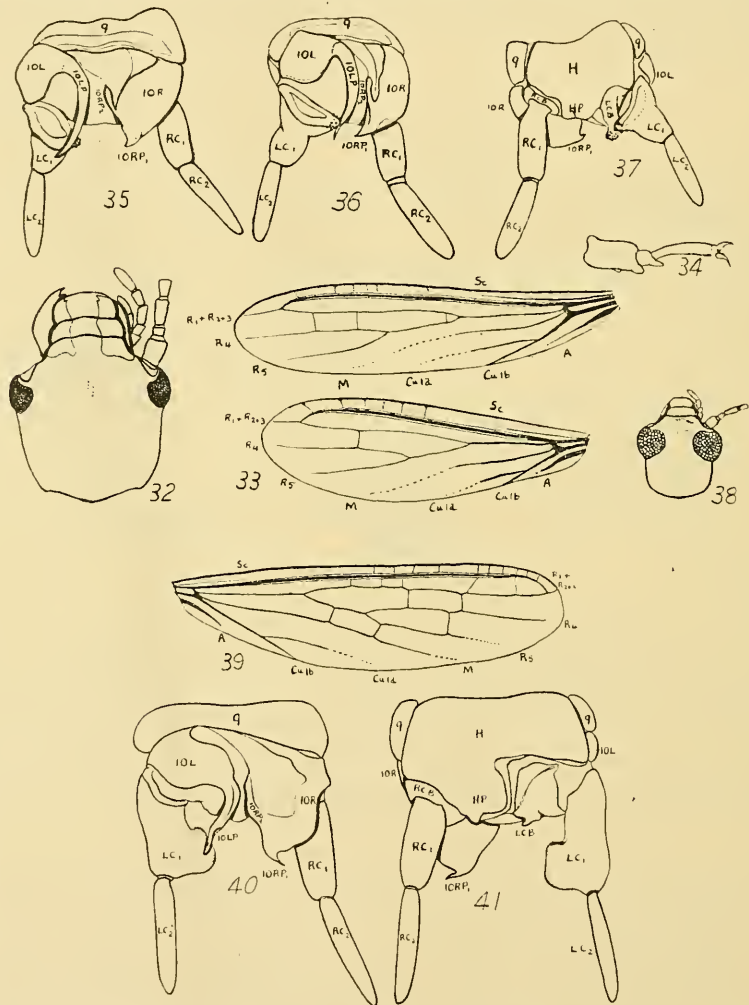
Embia salvini M'Lachlan,* 1877, *J. Linn. Soc. London, Zool.*, no. 70, p. 380.

The following re-description is from the unique type (M'Lachlan Collection, British Museum of Natural History):

♂. Length 10.5 mm.; head 1.9 × 1.5 mm.; forewing 6.5 × 1.5 mm.; hindwing 5.5 × 1.7 mm. General colour black, some sclerites very dark brown; wings with dark-brown bands, hyaline inter-venal lines narrow. Head (Fig. 32) with eyes rather prominent, sides behind eyes rounded, converging posteriorly. Mandibles as in *E. brasiliensis* and *E. batesi*. Antennae incomplete. Wings (Fig. 33) narrow, veins arranged as in *E. brasiliensis*; cross-veins few; media and anterior branch of

* Enderlein (1912, p. 30) refers to *E. salomi*, a lapsus calami for *salvini* (corrected l.c., p. 116).

cubitus becoming obsolete terminally. Hind tarsi (Fig. 34) as in *E. batesi*. Terminalia (Figs. 35-37) very characteristic; posterior process of right hemitergite ($10RP_1$) directed inward, subacute; inner process ($10RP_2$) less massive than in *E. batesi*. Left hemitergite ($10L$) somewhat similar to *E. brasiliensis*, the process ($10LP$) longer and thinner, without hooks. Right cercus with two elongate subcylindrical segments (RC_1 , RC_2), with a small annular basipodite (RCB). First segment of left cercus (LC_1) basally dilated internally in an obtuse



Figs. 32-37.—*Embolyntha salvini* (M'Lachlan), holotype ♂. 32. Head from above, $\times 15$. 33. Left fore- and hindwing, $\times 8$. 34. Hind tarsus viewed laterally, $\times 20$. 35. Terminalia from above, $\times 20$. 36. Terminalia from above and slightly to the left, $\times 20$. 37. Terminalia from below, $\times 20$.

Figs. 38-41.—*Embolyntha wagneri* (Navás), holotype ♂. 38. Head from above, $\times 8$. 39. Right forewing, $\times 6$. 40. Terminalia from above, $\times 20$. 41. Terminalia from below, $\times 20$.

echinulate lobe, distally smooth and subcylindrical; second segment (LC₂) subcylindrical. Hypandrium (H) produced to a blunt process (HP) to the right of the mid-line; left cercus-basipodite (LCB), between HP and base of LC₁, produced backwards, terminally slightly expanded into an echinulate lobe, lying adjacent to the echinulate lobe of LC₁.

♀ unknown.

Locality.—Chinautta, Central America, at 4100 ft., coll. Salvin.

EMBOLYNTHA WAGNERI (Navás 1923). Figs. 38-41.

Embia wagneri Navás 1923, *Rev. Acad. Cienc. Zaragoza*, viii, p. 13, fig. 3.

The following re-description is from Navás's unique type (Mus. Paris):

♂. Length 10 mm.; head 1.7 × 1.4 mm.; forewing 9 × 2.5 mm.; hindwing 8 × 2.4 mm. General colour dark ferruginous, eyes black; wings with R₁ dark brown, other veins golden-brown, bordered by bands of smoky mid-brown, hyaline inter-venal lines rather narrow. Head (Fig. 38) broad, eyes very large, prominent, almost circular in dorsal view; antennae approximately 6 mm. in length, the left with 25, the right with 24 segments. Wings (Fig. 39) as in *E. brasiliensis*. Hind tarsi missing in the type. Terminalia (Figs. 40-41) reminiscent of *E. brasiliensis*; right hemitergite (10R) with posterior process (10RP₁) acute, directed backward and to the right; inner margin of 10R sinuous, produced forward from 10RP₁ as a thickened flange or lobe (10RP₂) as in *E. brasiliensis*. Left hemitergite (10L) as in *E. brasiliensis* and *E. salvini*; process (10LP) long, slender, sinuous, without hooks as in *E. brasiliensis*, terminally subacute. Right cercus with two subcylindrical segments (RC₁, RC₂), with a small annular basipodite (RCB). First segment of left cercus (LC₁) with a square echinulate subterminal lobe internally, broader than in *E. brasiliensis*; second segment (LC₂) elongate-subcylindrical. Hypandrium (H) produced back to a blunt, weakly-bilobed process (HP), to the right of the mid-line. Left cercus-basipodite (LCB), between HP and base of LC₁, represented by a flat plate, with an oblique medial membraneous slit as in *E. brasiliensis*; LCB distally obtuse, with a small lobe projecting inwards and upwards.

♀ unknown.

Locality.—Argentina: 'Chaco de Santiago del Estero. Bords du Rio Salado. La Paliso del Bracho. 25 kil. N.O. (N.W.) d'Icaño. E.-R. Wagner, Décembre, 1905.'

Key to the Species of Embolyntha (♂).

1. First segment of left cercus with a basal internal echinulate lobe; left cercus-basipodite terminally echinulate *salvini* (M'Lachlan)
Echinulate lobe of first segment of left cercus not basal; left cercus-basipodite not echinulate 2
2. Posterior process of right hemitergite slender, directed outward; internal echinulate lobe of first segment of left cercus subterminal 3
Posterior process of right hemitergite short and thick, directed inward; internal lobe of first segment of left cercus medial (subterminal in non-typical variations) *batesi* (M'Lachlan)
3. Process of left hemitergite carrying two small hooks; internal lobe of first segment of left cercus longer than thick *brasiliensis* (Griffith & Pidgeon)
Process of left hemitergite not as above; internal lobe of first segment of left cercus broader than long *wagneri* (Navás)

Unrecognizable Species.

Olyntha ruficapilla Burmeister 1839.—This species has been discussed above (under *Embolyntha batesi*).

Embia klugi Rambur 1842, Histoire naturelle des Insectes, Névroptères, p. 313.—As far as can be said from the short description, this species may belong to *Embolyntha*; it cannot belong to *Embia*, because of the locality (Brazil). The type is apparently lost (it is not in the Paris Museum). The species must be deleted as unrecognizable.

Embia (Olyntha) mülleri Hagen, 1885, *Canad. Entomologist*, 17, p. 206.—The type, from Itajahy, Santa Cattarina, Southern Brazil, is in the Museum of Comparative Zoology, Harvard University. It is a dried female, labelled: 'Embiden larve. Itajahy, Brazil, 1879 Jr. (year). Mueller', and, in Hagen's writing, 'O. muelleri* Hag., Mon. Emb. p. 206, 17'. On account of its sex, it carries no specific characters; it may belong to *Embolyntha*, but it should be deleted as unrecognizable specifically.

Embia birabeni Navás 1918, *Brotéria*, *Série Zoológica*, xvi, p. 105, figs. 5a-c.—It is impossible to judge from Navás's description to which genus this species should be referred; it is probably referable to *Embolyntha*, possibly however to *Pararhagadochir*. Details of the left hemitergite are lacking; the posterior process of the right hemitergite seems to resemble *E. brasiliensis* and *E. wagneri*. Navás's figure of the first segment of the left cercus (i.e., fig. 5a) is merely a circle with a few lines representing setae; this is of course impossible. The type ♂, from Unquillo, Córdoba, Argentina (Mus. La Plata) requires re-examination. The species might possibly be synonymous with *E. wagneri* (Navás), also from the Argentine, which it would supersede by priority; but here, as in the case of *E. batesi*—*E. ruficapilla*, the certain name has been adopted in preference to the doubtful, though prior, name.

Embia piquetana Navás 1919. *Mem. Pont. Accad. Romana dei Nuovi Lincei*, Series ii, vol. 5, p. 25.—This species was described from a female from Santa Fé, Argentina. Of course, it cannot be recognized, as the females of this Order do not possess specific characters. The genus to which the specimen belonged may have been *Embolyntha*, or some other Neotropical genus. Navás's note (i.e.), that it is 'like *birabeni* Navás', resembles the blind leading the blind.

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